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POST STUMP APPARATUS
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(57) Claim

1 A post stump apparatus for releasably fixing a first member into a hole in a second member, the post stump apparatus comprising

a sleeve shaped to be received in the hole in the second member, the sleeve being shaped for facilitating its removal from the said hole in the second member, and the sleeve also being shaped to be received about a lower end of the first member;

a drive bolt for positioning through the lower end of the first member; and,

a locking hammer threadedly engaged with the drive bolt so that rotation of the drive bolt causes pivoting of the locking hammer inside the first member intermediate of the length of the locking hammer, a part of the locking hammer being disposed outside of the first member for binding with the inside wall of said hole in the second member upon rotation of the drive bolt so that the first member can be releasably secured to the second member

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PATENTS ACT 1990

**COMPLETE SPECIFICATION FOR A
STANDARD PATENT**

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Standard Complete Specification for the invention entitled

POST STUMP APPARATUS

Details of Associated Provisional Applications.

PN1182 lodged on February 16, 1995

Details of Parent Application for Divisional Applications:

The following is a full description of this invention, including the best method of performing it known to :-

TITLE

POST STUMP APPARATUS

FIELD OF THE INVENTION

5 The present invention relates to a post stump apparatus particularly, although not exclusively, envisaged for use in fixing roadside posts and the like into the ground, whilst allowing for easy replacement of the post in the event that it becomes damaged or otherwise is to be removed or replaced.

10 The post stump apparatus can be used wherever one member is intended to be removably attached to another member. Generally, one of the members is a post and the other member is a concrete footing in the ground. However, the other member could be a metal sleeve in a structure. Also, it is not essential that the first member be disposed vertically upwardly - it could be disposed at any angle.

BACKGROUND OF THE INVENTION

15 Typically, roadside signs are fixed into a concrete footing in the ground. In the event that the post is damaged, such as by being struck by a vehicle, the concrete footing must be dug out of the ground, the post and the footing disposed of and a new post set into a new concrete footing. This has the disadvantage that the footing must be replaced and the entire procedure is relatively slow and expensive.

20 A better system would allow for the footing to be reused and only the damaged post would need to be replaced.

SUMMARY OF THE INVENTION

Therefore it is an object of the present invention to provide a post stump apparatus which allows for a damaged post to be removed from its footing and replaced without requiring replacement of the footing.

25 In accordance with one aspect of the present invention there is provided a post stump apparatus for releasably fixing a first member into a hole in a second member, the post stump apparatus comprising:

30 a sleeve shaped to be received in the hole in the second member, the sleeve being shaped for facilitating its removal from the said hole in the second member, and the sleeve also being shaped to be received about a lower end of the first member,

a drive bolt for positioning through the lower end of the first member, and,

a locking hammer threadedly engaged with the drive bolt so that rotation of the drive bolt causes pivoting of the locking hammer inside the first member intermediate of

the length of the locking hammer, a part of the locking hammer being disposed outside of the first member for binding with the inside wall of said hole in the second member upon rotation of the drive bolt so that the first member can be releasably secured to the second member.

- 5 In accordance with another aspect of the present invention there is provided a post stump apparatus for releasably fixing a first member into a second member, the post stump apparatus comprising:

10 a sleeve shaped to be received in the second member, the sleeve being tapered from its upper end towards its lower end for facilitating removal of the sleeve from the second member;

a drive bolt for positioning through a lower end of the first member; and,

15 a locking hammer with a cam face for bearing against an inside wall of the first member and a nose for binding into an inside wall of the second member, the locking hammer being threadedly engaged with the drive bolt so that rotation of the drive bolt causes pivoting of the locking hammer inside the first member, through the lower end of the first member and causes binding of the nose into the inside wall of the second member so that the first member is secured to the second member.

Typically, the first member is a post, such as, for example, road side sign post or the like; and the second member is a concrete footing set into the ground at the road side

- 20 Hereinafter the present invention will be described with particular reference to first members being roadside posts although it is to be understood that it is of general applicability. For example, the first member could be a post in a set of play ground equipment, or a flag pole, or a temporary crowd control post or the like. Also, the invention will be described with particular reference to second members being concrete
- 25 footings, although it is to be understood that it is also of general applicability. For example, the second member could be a metal sleeve in a metal structure, a tapered hole in a wooden or plastics material structure or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

- 30 An exemplary embodiment of the present invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a an exploded perspective view of a post stump apparatus in accordance with the present invention, shown in relation to a post,

Figure 2 is a cross-sectional side view of the post stump apparatus of Figure 1, shown assembled and in situ in a concrete footing; and,

Figures 3 to 5 are respectively a front view, a side view and a plan view of one of a pair of identical sleeves of the post stump apparatus of Figure 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

5 In Figures 1 and 2 there is shown a post stump apparatus 10, a post 12 and a concrete footing 14. The post stump apparatus 10 comprises a pair of substantially identical sleeves 20, a pair of substantially identical collars 22, a drive bolt 24 and a locking hammer 26.

In the exemplary embodiment the post 12 is square, although it could be rectangular or circular or elliptical or an irregular shape.

10 Particularly as shown in Figures 1 and 3 to 5 the sleeves 20 are each substantially U-shaped in cross-section and are dimensioned to fit about the perimeter of the lower end of the post 12. Each sleeve 20 has side walls 30, 32 and 34 which taper from proximate an upper end 36 of the sleeve 20 to the lower end 38 of the sleeve 20. Typically, the taper is at an angle of about 1° or so. Typically, the side walls 30, 32 and 34 are substantially parallel in the region of the upper end 36 above the tapered portion of the walls 30, 32 and 15 34. The sleeves 20 are each provided with a shoulder 36 and a recess 38 towards the upper end 36. The sleeves 20 each also has a slot 40 located in the lower end 38 of the side wall 32 and disposed towards the upper end 36. Typically, the sleeves 20 are made from plastics material, such as UV stabilised polypropylene or the like corrosion resistant material which will not become bonded to concrete in the footing 14.

20 The collars 22 are each also substantially U-shaped in cross-section and dimensioned to fit about a lower end 44 of the post 12. The collars 22 are each received in a respective one of the recesses 38 of the sleeves 20. A lower end of the collars 22 rests upon or is adjacent the shoulders 36 of the sleeves 20. The collars 22 are typically made from metal materials for reinforcing the post 12 and inhibiting bending of the post 12 in the vicinity of the 25 surface of the ground 50 in which the post 12 is set (as shown in Figure 2). To this end the collars 22 are made from high shear strength material such as metal materials. Typically, about half of the height of the collars 22 is below the surface of the ground 50 and half of the height of the collars 22 is above the surface of the ground 50.

30 The drive bolt 24 is receiving in holes 60, 62 and 64 located in the sleeves 20, the collars 22 and the post 12 respectively. The holes 60, 62 and 64 are located so that they overlap when the sleeves 20 and the collars 22 are positioned about the post 12. The drive bolt 24 has a head 70, two washers 72 and a nut 74. The drive bolt 24 is threaded along its shank 76. The drive bolt 24 has the effect of securing the sleeves 20 and the collars 22 onto the post 12.

35 The locking hammer 26 has a neck 80, a cam face 82 and a nose 84. The neck 80 has a

free end 86 with a radial slot 88 having an axial hole 90 for receiving a pivot pin 92. The pivot pin 92 has a threaded hole 94 for threaded engagement with the drive bolt 24. The pivot pin 92 is free to pivot in the radial slot 88 so that the locking hammer 26 is free to pivot about the drive bolt 24. Rotation of the drive bolt 24 in a clockwise direction causes the free end 86 of the neck 80 to travel along the shank 76 of the drive bolt 24 in the direction of arrow 98 as shown in Figure 2. Similarly, rotation of the drive bolt 24 in the reverse direction causes travel of the free end 86 of the neck 80 in a direction opposite to the arrow 98. The nose 84 is located remotely from the cam face 82 and towards a lower end of the locking hammer 24. The nose 84 has a binding face 100 for binding into an inside side wall of the concrete footing 14 into which the post 12 is to be fixed. The nose 84 is disposed through a slot 110 in the lower end 44 of the post 12 opposite from the cam face 82. The slot 110 overlies the slot 40 in the sleeve 20.

The cam face 82 is disposed to bear against an inside of the wall of the lower end 44 the post 12. This has the effect that when the drive bolt 24 is rotated and the neck 80 travels along the drive bolt 24 the cam face 82 bears against the inside side wall of the post 12 and causes the locking hammer 26 to pivot. The pivoting causes the nose 84 to project through of the slots 40 and 110, which causes the binding face 100 to bind into the inside side wall of the concrete footing 14. The binding face 100 is curved so that only a relatively small portion of the binding face 100 binds against the wall. This has the advantage that the binding face 100 can allow for inaccuracies in the shape of the wall of the footing 14. The length of the locking hammer 26 and the amount of the curvature of the cam face 82 control the rate of projection of the nose 84 through the slots 40 and 110.

It is envisaged that a U-shaped plug or washer could be located in the post 12 and sitting upon the free end 86 of the locking hammer 26. The U-shaped plug is intended to have the effect of ensuring that bending of the post 12 does not foul the drive bolt 24. This is achieved by ensuring that the bending of the post 12 is confined to locations above the height of the collars 22. To such end the plug member is made from a high shear strength material, such as metal materials.

In use, a hole is dug in the ground at which the post 12 is to be erected. The hole is filled with uncured concrete to form the footing 14. A former is positioned in the uncured concrete to define a recess into which the post stump apparatus 10 of the present invention is to be positioned. The former typically has an external shape which is complimentary to the external shape of the sleeves 20. Once the concrete is cured the former is removed and the footing 14 is ready to receive the post stump apparatus 10.

One of the washers 72 is located upon the shank 76 of the drive bolt 24. Then one of the collars 22 is located in the recessed 38 of one of the sleeves 20. The shank 76 of the drive

bolt 24 is passed through the holes 60 and 62 of the sleeve 20 and the collar 22. The shank 76 of the drive bolt 24 is then passed through the hole 64 in the post 12 and through the threaded hole 94 in the pivot pin 92 of the locking hammer 26 and out through the other hole 64 in the post 12. The other collar 22 and the other sleeve 20 are then passed
5 over the shank 76 of the drive bolt 24 and the other washer 72 and nut 74 loosely threaded onto the drive bolt 24. So assembled the nose 84 is located within the confines of the post 12 and/or the sleeves 20.

The post stump apparatus 10 so assembled upon the end 44 of the post 12 can then be inserted into the hole in the footing 14. The apparatus 10 is inserted until the tapered walls
10 30, 32 and 34 bear against the inside of the hole in the footing 14. The tapered walls 30, 32 and 34 have the effect of settling the post 12 so that it is relatively on axis with an axis of the hole in the footing 14 which makes the post 12 relatively firm in the ground even when the locking hammer 26 has not been tightened. The advantage of this is that it is not the locking hammer 26 alone which secures the post 12 into the footing 14.

15 A spanner or the like is then applied to the head 70 of the drive bolt 24 to rotate the drive bolt 24 in a clockwise direction. This causes the pivot pin 92 to travel along the shank 76 of the drive bolt 24 towards the head 70. This travel causes the locking hammer 26 to pivot with the cam face 82 bearing against the inside wall of the post 12. The pivoting also causes the nose 84 to project out through the slots 40 and 110 until the binding face 100
20 comes into contact with the inside wall of the footing 14. Further torque applied to the drive bolt 24 causes greater binding force to be applied to the footing 14 and hence a tighter locking of the post 12 to the footing 14. The nut 74 is then tightened upon the shank 76 of the drive bolt 24 to inhibit unintentional loosening of the drive bolt 24.

In the event that a vehicle collides with the post 12, the post 12 tends to bend above the
25 surface of the ground 50 and above the collars 22. The post 12 can then be removed by loosening the nut 74 and then rotating the drive bolt 24 in an anti-clockwise direction. This causes the nose 84 to be withdrawn from contact with the footing 14 and back into the post 12. The post 12 can then be pulled out of the footing 14 without damage to the footing 14. The post stump apparatus 10 can then be applied to a new post 12 and re-
30 inserted into the footing 14 and re-tightened.

Advantages

The post stump apparatus 10 of the present invention has the advantage that a post 12 can be removed and replaced, if damaged or otherwise requiring removal or replacement, whilst using the same footing 14. Hence, posts 12 can be replaced more quickly and with
35 less expense. Further, the tapering of the walls 30, 32 and 34 allow for better holding of the post 12 into the footing 14 and easier removal of the post 12 from the footing 14 than

would be the case for a parallel sided sleeve)

Modifications

- Modifications and variations such as would be apparent to a skill addressee are considered within the scope of the present invention. For example, the components of the post stump apparatus 10 could be made from materials other than those discussed hereinabove. Also, the shape of the post 12 could be other than square, provide that the collars 22 and the sleeves 20 have a shape complimentary to that of the post 12. For example, the post 12 could be round or oval in cross-section. Further, the sleeves 20 need not be secured to the post 12 with the drive bolt 24. Similarly, the collars 22 could have slots extending up to their upper end in place of the holes 62. Still further, the slot 40 in the sleeve 20 on the side of the post 12 at which the head 70 of the drive bolt 24 is located could be omitted. Still further, the slots 40 and 110 could be eliminated entirely and the post 12 cut off above the nose 84 of the locking hammer 26 but below the can face 82 of the locking hammer 26. Still further, the nut 74 could be omitted and replaced by a plastics material thread cap. Still further, the shank of the drive bolt 24 could have its thread ceased slightly inside the confines of the post 12 so that the locking hammer 26 can not be over-tightened by over rotation of the drive bolt 24.

CLAIMS

The Claims defining the invention are as follows:

1. A post stump apparatus for releasably fixing a first member into a hole in a second member, the post stump apparatus comprising:
 - 5 a sleeve shaped to be received in the hole in the second member, the sleeve being shaped for facilitating its removal from the said hole in the second member, and the sleeve also being shaped to be received about a lower end of the first member;
 - a drive bolt for positioning through the lower end of the first member; and,
 - 10 a locking hammer threadedly engaged with the drive bolt so that rotation of the drive bolt causes pivoting of the locking hammer inside the first member intermediate of the length of the locking hammer, a part of the locking hammer being disposed outside of the first member for binding with the inside wall of said hole in the second member upon rotation of the drive bolt so that the first member can be releasably secured to the second member.
- 15 2. A post stump apparatus according to Claim 1, in which the a locking hammer has a cam face for bearing against an inside wall of the first member and a nose for binding into an inside wall of the second member so that rotation of the drive bolt causes pivoting of the locking hammer inside the first member and causes binding of the said nose into the inside wall of the second member so that the first member is secured to the second
20 member.
3. A post stump apparatus according to Claim 1 or 2, in which the sleeve is tapered from proximate its upper end towards its lower end and the said hole in the second member has a similar taper, the tapering of the sleeve causing wedging of the first member into the hole in the second member for providing further securement of the first member to
25 the second member, and the tapering of the sleeve also facilitating easier removal of the first member from the second member
4. A post stump apparatus according to any one of Claims 1 to 3, also comprising a collar located proximate the upper end of the sleeve and located between the sleeve and the first member, the collar being made of high shear strength material so that bending of
30 the first member is confined to regions above the collar and inhibited from causing bending of the first member at or below the drive bolt
5. A post stump apparatus according to any one of Claims 1 to 4, also comprising a plug member inserted in to the first member and positioned to sit above the drive bolt, the plug member being made of high shear strength material so that bending of the first

member is confined to regions above the plug member.

6. A post stump apparatus according to any one of Claims 1 to 5, in which locking hammer has a neck having a free end with a radial slot having an axial hole in which is received a threaded pivot pin for threaded engagement with the drive bolt, the pivot pin being free to pivot in the radial slot so that the locking hammer is free to pivot about the drive bolt, and wherein rotation of the drive bolt causes the free end of the neck to travel along the drive bolt so that the cam face bears against the inside of the first member for causing the nose to bind into an inside side wall of the second member for locking the first member to the second member.
7. A post stump apparatus according to Claim 6, in which the binding face is curved so that only a relatively small portion of the binding face binds against the said inside wall.
8. A post stump apparatus according to Claim 6 or 7, in which the length of the locking hammer and the rate of the curvature of the cam face are chosen so as to achieve a desired rate of projection of the nose to bind with the said inside wall.
9. A post stump apparatus according to any one of Claims 6 to 8, in which the distance from the cam face to the attachment of the locking hammer to the drive bolt is greater than the distance from the cam face to the said nose so as to achieve a mechanical advantage in the pivoting of the locking hammer for achieving a greater binding force between the locking hammer and the inside wall of the second member.
10. A post stump apparatus according to any one of Claims 1 to 9, in which the first member is a post and the second member is a concrete footing.
11. A post stump apparatus substantially as herein described with reference to and as illustrated in any one or more of the accompanying drawings.

Dated this 16th day of February, 1996

KASTEN CLAMP CO PTY LTD
By Patent Attorney

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ABSTRACT

A post stump apparatus (10) for the removable securement of a post (12) to a footing (14). The apparatus (10) has a locking hammer (26) which is caused to pivot by a drive bolt (24) for causing bearing a cam face (82) against an inside of the post (12) for causing
5 a nose (84) of the locking hammer (26) to bind into an inside wall of the footing (14). A tapered sleeve (20) is also used to increase the binding of the post (12) into the footing (14) and also for facilitating easier removal of the said post (12).

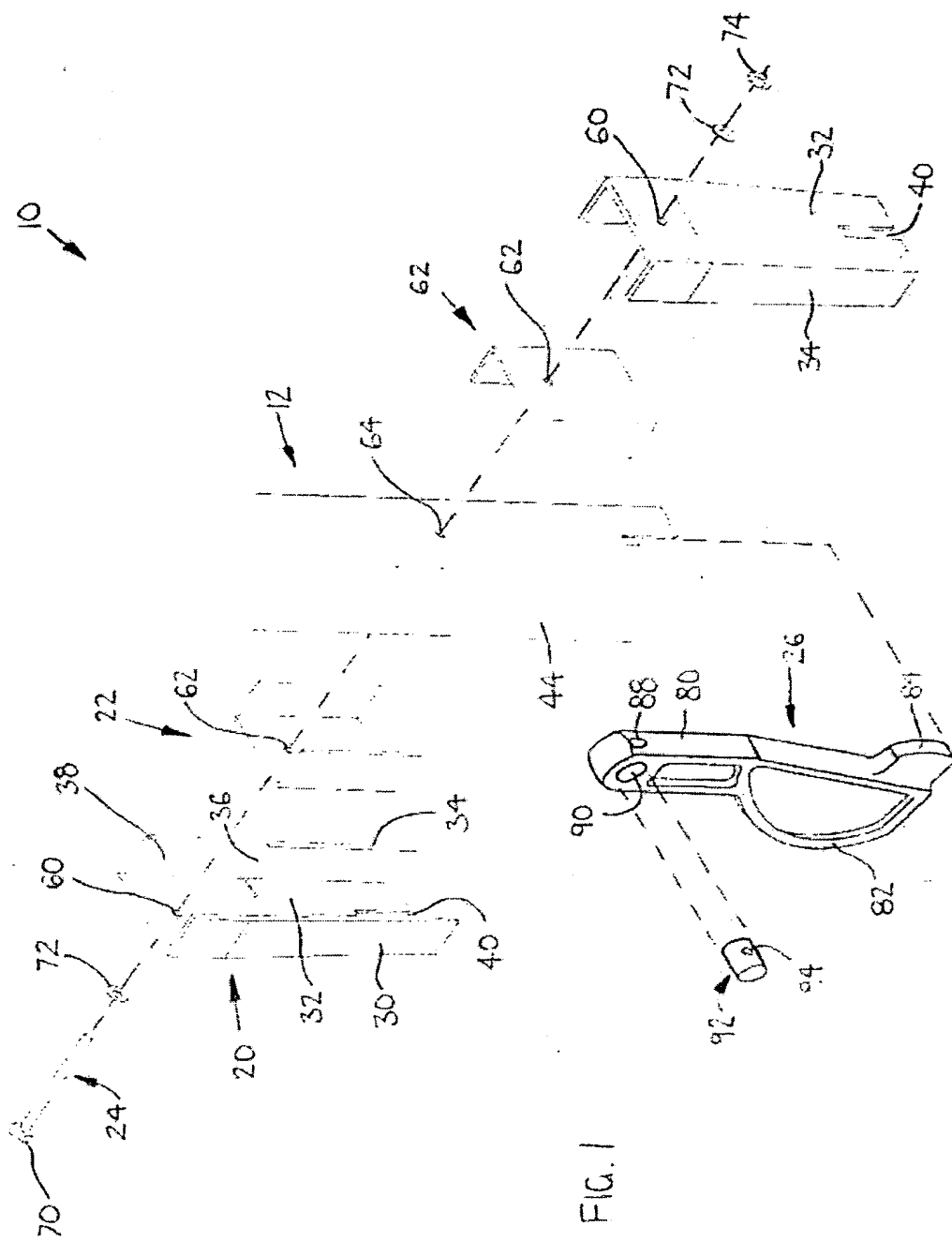
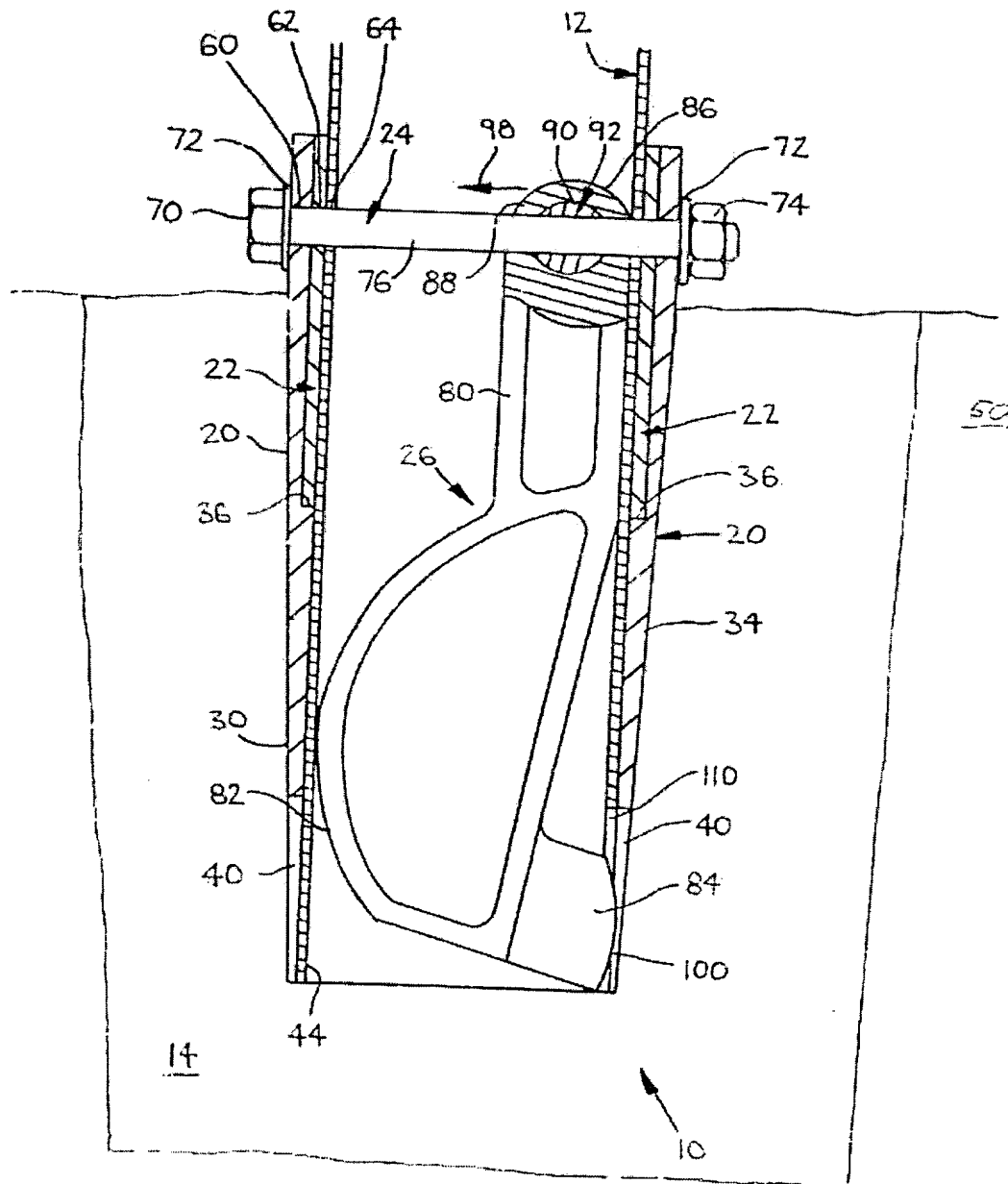


FIG. 1



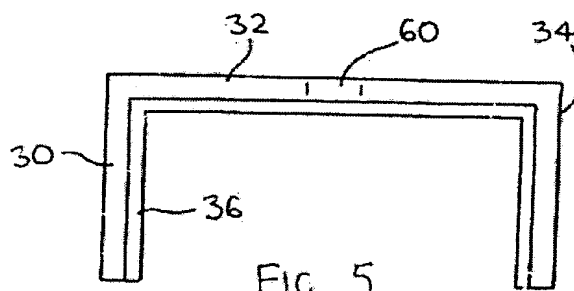
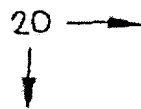


FIG. 5.

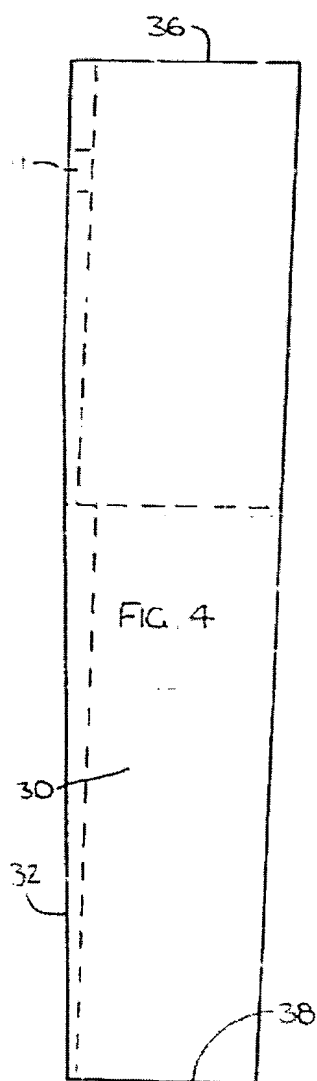


FIG. 4

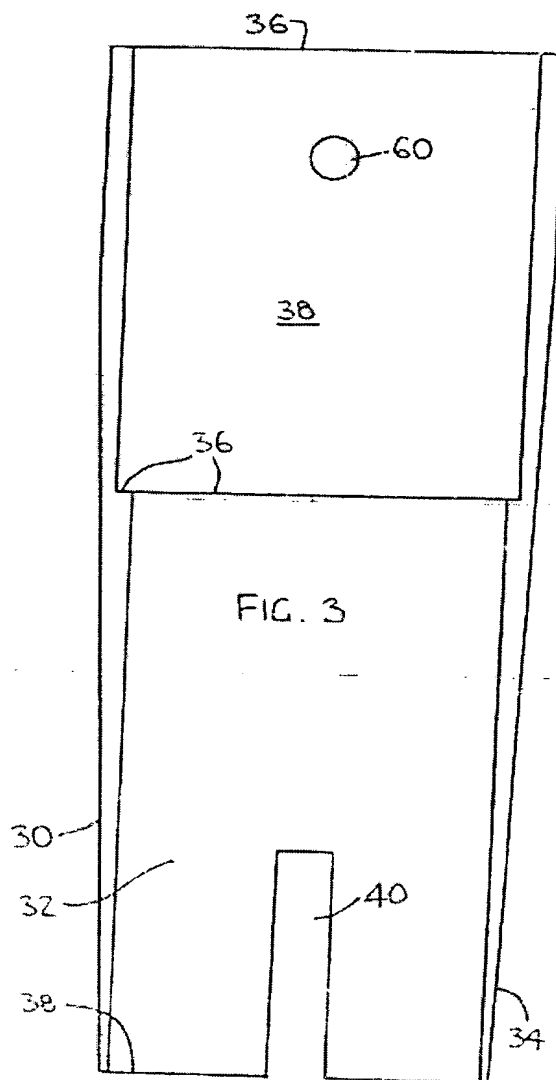


FIG. 3

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